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## Introduction

For more than 100 years, the Coeur d’Alene River basin has earned its cognomen as “The Silver Valley” by being one of the most productive silver, lead, and zinc mining areas in the United States. Its history is as rich as the millions of tons of ore that have been extracted and processed there. But that history has left a legacy of contamination that extends 166 miles across the state of Idaho, through Lake Coeur d’Alene and down the Spokane River into the state of Washington. A U.S. Environmental Protection Agency (EPA) plan to clean up this contamination under Superfund<sup>1</sup> proposes spending hundreds of millions of dollars over three decades—and even this effort is not expected to complete the job. As might be expected of any undertaking of this magnitude, the plan has created substantial controversy and confusion. This report reviews and evaluates many of the issues and concerns that have been raised regarding EPA’s decisions.

### COEUR D’ALENE RIVER BASIN

The headwaters of the South Fork of the Coeur d’Alene River begin in the Bitterroot Mountain Range at the Idaho-Montana border, and the river flows westward as a high-gradient mountain stream past the town of Mullan

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<sup>1</sup>The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (P.L. 96-510) established a “Superfund” to identify contaminated sites, determine responsible parties, and finance cleanups when responsible parties could not. EPA administers the Superfund program in cooperation with individual states and tribal governments.

to Wallace, Idaho, where it joins two large tributaries, Canyon and Ninemile Creek. Below Wallace, the valley broadens, the channel gradient begins to diminish, and the river increases in flow as it passes the Idaho communities of Osburn, Kellogg, Smelterville, and Pinehurst. Below Pinehurst, the South Fork joins the North Fork, and the valley widens to several miles, with the floodplain containing thousands of acres of wetlands and small lakes that provide a valuable stopping place for migratory waterfowl. Some 70 miles from its source, the river empties into the 25-mile-long Lake Coeur d'Alene, which in turn is drained by the Spokane River at its northern end.

In the late 1800s and through most of the 20th century, the upper and middle portions of the basin were a major mining region—the “fabulous Coeur d'Alene” (see Chapter 2 of this report). The area had more than 100 mines and ore processing operations producing silver, lead, zinc, and other metals. The Bunker Hill Mine and Smelting Complex, located in Kellogg, Idaho, was the largest of these, and, when the Bunker Hill smelter was built, it was the largest smelter in the world. The Coeur d'Alene mines produced and processed an estimated 130 million metric tons (more than 140 million U.S. tons) of ore during their first century of operation (Long 1998). Today, although a few mines continue to operate, most have closed; the smelting complex is shut down and most of its facilities have been demolished.

The mining, processing, and smelting of such a huge volume of ore resulted in widespread environmental contamination. Many of the mine tailings throughout the region were discharged directly to Coeur d'Alene River and its tributaries until 1968 when the practice was prohibited. Smelting operations at Bunker Hill also discharged large quantities of sulfur dioxide, lead, and other metals that affected local communities and the environment. During operation of the smelter—particularly in the early 1970s when its pollution-control devices failed—large numbers of nearby residents, especially children, had highly elevated blood lead levels (BLLs) (IDHW 1976). The wastes produced by the milling and processing operations pose risks to residents of the area and to the wildlife—particularly fish and migratory birds—that depend on the basin's natural resources.

## SUPERFUND DESIGNATION

In 1983, EPA listed the Bunker Hill Mining and Metallurgical Complex on the National Priorities List (NPL).<sup>2</sup> This site encompasses a 21-square-mile rectangular area (commonly called “the box”) surrounding the Bunker Hill smelter complex. The site was divided into two operable units (OUs):

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<sup>2</sup>The National Priorities List is intended primarily to guide EPA in determining which sites warrant further investigation under Superfund.

OU-1 covered the “populated areas” of the box and OU-2 covered the “nonpopulated areas,” including the former smelter and industrial facility. Cleanup began in earnest after EPA issued the record of decision (ROD) for OU-1 in 1991 and for OU-2 in 1992. Although much of the area within the box has been cleaned up, remedial activities are still under way.

In February 1998, EPA announced that it would extend its Superfund remedial authorities outside the box. Until then, the agency had attempted to address contamination problems outside the box without invoking the formal Superfund process. The agency concluded, however, that the authorities it had been applying to address the widespread contamination and risks to human health and the environment posed by the mining-related wastes outside the box were insufficient (EPA 2004).

This action resulted in the addition of OU-3 that covers all the contaminated areas in the basin, Lake Coeur d’Alene, and the Spokane River, outside the original box. This controversial extension created a large degree of contention among residents within the basin, as many new communities were given the “Superfund” designation. Not surprisingly, many residents were concerned and angry over the designation of their community as a Superfund site and the perception that the designation and associated stigma would be long-lasting and further depress an economy already suffering severely from the loss of mining-related jobs. This fear was bolstered by the reality that the box has remained on the NPL since its listing in 1983, and the ROD for OU-3 established a 30-year “interim” remedial plan. Furthermore, confusion about the OU-3 site designation was magnified by the inexact nature of the site boundaries.<sup>3</sup> This situation is understandably stressful and confusing for residents and landowners within the basin, as there is no straightforward mechanism to determine whether property is located within the Superfund site.

### COEUR D’ALENE RIVER BASIN AS A MINING MEGASITE

Cleaning up the Coeur d’Alene River basin is a major challenge for EPA’s Superfund program. The amount and wide distribution of waste materials preclude complete remediation with traditional cleanup approaches such as removal and capping. Large portions of the communities

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<sup>3</sup>The Superfund site is considered to be “all areas of the Coeur d’Alene Basin where mining contamination has come to be located.” Although areas where contamination does not exist are not included in the site, this designation has led to the widespread notion that the Superfund site encompassed the entire 1,500-square-mile watershed of the Coeur d’Alene River between the Montana border and the confluence of the Spokane River with the Columbia River (for discussion, see Villa 2003). This issue is addressed by EPA in the ROD, Part 3, Responsiveness Summary (EPA 2002), under: “General comment: Concerns about the boundaries of the Superfund site,” p. 2-4.

are built on top of mining wastes, and infrastructure, such as the embankment of Interstate 90, is built out of them. Every flood distributes these wastes further, and the contaminants undergo chemical changes—which can increase or decrease the risk they pose—as they travel through the river basin. Thousands of people living in multiple political jurisdictions are involved, and some cleanup efforts are expected to take centuries to achieve ambient environmental protection standards even after hundreds of millions of dollars are spent on cleanup activities.

This site is not, however, an isolated case. There are thousands of abandoned hardrock mining areas throughout the country, particularly in the western states<sup>4</sup> (see Chapter 9). EPA has already listed 63 of these on the NPL, and some have many of the same characteristics as the Coeur d'Alene River basin—they are extensive, expensive, complex, and controversial, with private parties that may be unable or unwilling to accept responsibility for the cleanup. EPA has come to call sites like the Coeur d'Alene River basin “megasites”<sup>5</sup> and is increasingly concerned about how to handle them with the diminishing cleanup funds it has available. Experience at the Coeur d'Alene River basin provides some useful insights into this question.

### THE COMMITTEE'S CHARGE

To evaluate scientific and technical aspects of the Superfund designation to OU-3, Congress instructed EPA to arrange with the National Academy of Sciences (NAS) to undertake an independent evaluation of the Coeur d'Alene River basin Superfund site.<sup>6</sup> The study was funded by a Congressional appropriation in the 2003 Consolidated Appropriations Resolution (P.L. 108-7). The corresponding bill report (Report 107-740) from the U.S. House of Representatives Appropriations Committee indicated that it wanted NAS to consider:

EPA's scientific and technical practices in Superfund site definition, human and ecologic assessment, remedial planning, and decision making. NAS is further expected to assess the adequacy and application of EPA's own Superfund guidance in terms of currently available scientific and technical knowledge and best practices, as well as to provide guidance to facilitate scientifically based and timely decision making for the Coeur d'Alene site.

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<sup>4</sup>Hard rock mines exclude coal and certain industrial mineral mines, such as sand and gravel mines.

<sup>5</sup>The general definition of a megasite is that it probably will cost more than \$50 million dollars to clean it up to the standards called for in the Superfund legislation.

<sup>6</sup>Designated on the NPL as the Bunker Hill Mining and Metallurgical Complex.

In making this request, Congress made it clear that it did not expect “NAS to recommend a specific remedial strategy for this site” and that it did not intend “that ongoing and planned remediation activities within the original 21 square mile NPL site be disrupted or adversely impacted in any way” because of the study.

In response, the Committee on Superfund Site Assessment and Remediation in the Coeur d’Alene River Basin was convened by the National Research Council (NRC) of NAS. The committee, composed of members with a wide range of backgrounds and expertise, was charged to consider the specific tasks provided in the statement of task (see Appendix A for the statement of task and committee member biosketches). The topics within the task roughly parallel the Superfund evaluation process and pertain to the various decision documents relating to OU-3, including site characterization in the remedial investigation, the ecologic risk assessment, the human health risk assessment, the integrated exposure uptake biokinetic model (a model used by EPA to evaluate soil cleanup levels for lead in the human health risk assessment), and remedial decisions covered in the feasibility study and the ROD. Finally, the statement of task directs the committee to develop “lessons learned” from the evaluation of this site that can be extrapolated to other sites and considered at the national level. The chapters of this report reflect the components of the statement of task.

### NATIONAL RESEARCH COUNCIL AND THE COMMITTEE PROCESS

The NRC of NAS is a nonfederal, nonprofit institution that provides objective science, technology, and health policy advice generally by producing consensus reports authored by committees. The NRC exists to provide independent advice; it has no governmental affiliation and is not regulatory in nature. The committee was constituted only to review and evaluate the scientific and technical aspects of the remedial proposals and whether these proposals conformed to the relevant regulatory guidance.

There is no direct oversight of a committee by the study sponsor or any other outside parties. In this regard, EPA and other interested parties have no more input or access to committee deliberations than the general public. This arrangement permits the committee complete independence in conducting its study. The committee members represent a wide range of backgrounds and expertise and conduct their work solely as a public service, volunteering to the NRC and the nation, cognizant of the importance of providing timely and objective scientific advice.

In conducting its review and evaluation, the committee relied on the Superfund site decision documents and supporting materials, other scientific studies including those conducted in the Coeur d’Alene River basin,

technical presentations made to the committee by investigators, presentations to the committee by the public, other information submitted by individuals and interest groups (including expert witness reports from the natural resources damage assessment case currently under way in federal court),<sup>7</sup> and the committee's observations while visiting and touring the site. The committee presented written questions and information requests to EPA, the state of Idaho, and the state of Washington when further clarification was needed. All information that was received by NRC staff was made available to committee members and is available to the public through NRC's public access records office.

The committee held five meetings. Three of the meetings included open, information-gathering sessions where the committee heard from invited speakers and from interested members of the public. The first public session (in January 2004) was in Washington, DC. Two meetings (one in April and one in June 2004) were held in the Coeur d'Alene region, and the committee toured a length of the Coeur d'Alene River basin from Burke, Idaho, to Spokane, Washington, and held public comment sessions in Wallace, Idaho, and Spokane, Washington. The entire final two meetings were closed, deliberative sessions attended only by committee members and NRC staff.

Issues at the Coeur d'Alene River basin site are complex and have a long history; as such, this review addresses some issues in greater detail than others. For example, the statement of task (Appendix A) requests the committee to review the adequacy and adherence to guidance on a scientific and technical basis. The committee was not asked to provide a legal review and therefore the report does not provide a clause-by-clause review of compliance with the National Contingency Plan and the Comprehensive Environmental Response, Compensation, and Liability Act. There were also numerous concerns expressed by the public that are outside the purview of the committee. Some of these relate to limitations in the legislation establishing Superfund, some to issues outside EPA's responsibility, some to policy decisions made by the agency, and some to statements agency personnel have made explaining these decisions.

One question often raised to the committee was whether the benefits expected to result from the cleanup are worth the high costs required to achieve them. Certainly this is an expensive project. EPA projected the

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<sup>7</sup>In the natural resources damage assessment court case, the Coeur d'Alene tribe and Federal Trustees (U.S. Fish and Wildlife Service and others) are suing a consortium of mining companies for damages to the environment in the Coeur d'Alene River basin. The committee did not engage in or follow this legal process as it is not within its purview. The committee did have access to expert witness reports (which are public documents) from this case that were relevant to aspects of the Coeur d'Alene River basin environment related to their statement of task.

discounted costs over the first three decades to be approximately \$360 million, including approximately \$92 million to protect human health in the basin and approximately \$250 million primarily for environmental protection (EPA 2002, Table 12.0-1). The current population of children in the basin (the primary intended beneficiaries of remedial efforts in residential areas) is small, and it remains unclear how much conditions will actually be improved for the fish and waterfowl by the interim measures being proposed. Thus, the question “Is it worth it?” is often raised. This question, however, pertains to the requirements of the applicable federal laws and is not germane to the question of how the agency has implemented these laws. The committee has, as specified in its charge, focused on the agency’s implementation and has not addressed the broader questions about the value of these expenditures.

In this and other ways, the committee has focused on addressing issues within the statement of task. The committee attempted to strike a balance in addressing the larger issues while providing sufficient detail to explain its conclusions and recommendations. It became clear to the committee that the evaluation and remediation process are continuing. New information is being gathered, experiments on possible remedial approaches are being conducted, and proposed remedies are being revised. This process will continue for decades and perhaps centuries. Thus, the committee does not consider its review to be the last word, but hopes that its findings and recommendations will assist government agencies and other stakeholders in improving the approaches to address large complex mining megasites such as the Coeur d’Alene River basin.

## REFERENCES

- EPA (U.S. Environmental Protection Agency). 2002. The Bunker Hill Mining and Metallurgical Complex: Operable Unit 3, Record of Decision. U.S. Environmental Protection Agency, Region 10. September 2002 [online]. Available: <http://yosemite.epa.gov/R10/CLEANUP.NSF/74e73c4c.720b643888256cdb006958af/cbc45a44fa1ede3988256ce9005623b1!OpenDocument>.
- EPA (U.S. Environmental Protection Agency). 2004. EPA Responses to NAS Questions from March 18, 2004. (April 6, 2004).
- IDHW (Idaho Department of Health and Welfare). 1976. Shoshone Lead Health Project. Work Summary. Health Care No. ENV 11. Boise, ID: Idaho Department of Health and Welfare, Division of Health. January 1976. 187 pp.
- Long, K.R. 1998. Production and Disposal of Mill Tailings in the Coeur d’Alene Mining Region, Shoshone County, Idaho: Preliminary Estimates. U. S. Geological Survey Open File Report 98-595. U.S. Department of the Interior, U.S. Geological Survey, Tucson, AZ.
- Villa, C.J. 2003. Superfund vs. Mega-Sites: The Coeur d’Alene River basin story. *Columbia J. Environ. Law* 28(2):255-324.